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IMPLEMENTATION PLAN REVIEW FOR ARKANSAS AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

TRW/Environmental Services

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IMPLEMENTATION PLAN REVIEW

FOR

ARKANSAS

AS REQUIRED

BY

THE ENERGY SUPPLY

AND

ENVIRONMENTAL COORDINATION ACT

U. S. ENVIRONMENTAL PROTECTION AGENCY

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16. ABSTRACT

Section IV of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interferring with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section IV of ESECA, is EPA's report to the State indicating where regulations might be revised.

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FOR
ARKANSAS
REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

PREPARED BY THE FOLLOWING TASK FORCE:

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(Contract 68-02-1385)

U. S. Environmental Protection Agency
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

April 1975

ARKANSAS

ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT
(SECTION IV - STATE IMPLEMENTATION PLAN REVIEW)

TABLE OF CONTENTS

		Page
1.0	EXECUTIVE SUMMARY	1
2.0	REVIEW OF THE STATE IMPLEMENTATION PLAN AND CURRENT AIR QUALITY	7
	2.1 Summary	7
	2.2 Air Quality Setting for the State of Arkansas	12
	2.3 Background on the Development of the Current State Implementation Plan	14
	2.4 Special Considerations for the State of Arkansas	18
3.0	AQCR ASSESSMENTS	20
	3.1 Regional Air Quality	20
	3.2 Statewide Fuel Use for Point Sources	21
	3.3 Power Plant Assessment	21
	3.4 Industrial/Commercial/Institutional Source Assessment	23
	3.5 Area Source Assessments	25
4.0	TECHNICAL APPENDICES	
	APPENDIX A	A-1
	APPENDIX B	B-1
	APPENDIX C	C-1
	APPENDIX D	D-1
	BIBLIOGRAPHY	

1.0 EXECUTIVE SUMMARY

The enclosed report is the U. S. Environmental Protection Agency's (EPA) response to Section IV of the Energy Supply and Environmental Coordination Act of 1974 (ESECA). Section IV requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). In addition to requiring that EPA report to the State on whether control regulations might be revised, ESECA provides that EPA must approve or disapprove any revised regulations relating to fuel burning stationary sources within three months after they are submitted to EPA by the States. The States may, as in the Clean Air Act of 1970, initiate State Implementation Plan revisions; ESECA does not, however, require States to change any existing plan.

Congress has intended that this report provide the State with information on excessively restrictive control regulations. The intent of ESECA is that SIP's, wherever possible, be revised in the interest of conserving low sulfur fuels or converting sources which burn oil or natural gas to coal. EPA's objective in carrying out the SIP reviews, therefore, has been to try to establish if emissions from combustion sources may be increased. Where an indication can be found that emissions from certain fuel burning sources can be increased and still attain and maintain NAAQS, it may be plausible that fuel resource allocations can be altered for "clean fuel savings" in a manner consistent with both environmental and national energy needs.

In many respects, the ESECA SIP reviews parallel EPA's policy on clean fuels. The Clean Fuels Policy has consisted of reviewing implementation plans with regards to saving low sulfur fuels and, where the primary sulfur dioxide air quality standards were not exceeded, to encourage States to either defer compliance regulations or to revise the SO_2 emission regulations. The States have also been asked to discourage large scale shifts from coal to oil where this could be done without jeopardizing the attainment and maintenance of the NAAQS.

To date, EPA's fuels policy has addressed only those States with the largest clean fuels saving potential. Several of these States have or are currently in the process of revising SO_2 regulations. These States are generally in the Eastern half of the United States. ESECA, however, extends the analysis of potentially over-restrictive regulations to all 55 States and territories. In addition, the current reviews address the attainment and maintenance of all the National Ambient Air Quality Standards.

There are, in general, three predominant reasons for the existence of overly restrictive emission limitations within the State Implementation Plans. These are 1) The use of the example region approach in developing State-wide air quality control strategies; 2) the existence of State Air Quality Standards which are more stringent than NAAQS; and 3) the "hot spots" in only part of an Air Quality Control Region (AQCR) which have been used as the basis for controlling the entire region. Since each of these situations affect many State plans and in some instances conflict with current national energy concerns, a review of the State Implementation Plans is a logical follow-up to EPA's initial appraisal of the SIP's conducted in 1972. At that time SIP's were approved by EPA if they demonstrated the attainment of NAAQS or more stringent state air quality standards. Also, at that time an acceptable method for formulating control strategies was the use of an example region for demonstrating the attainment of the standards.

The example region concept permitted a State to identify the most polluted air quality control region (AQCR) and adopt control regulations which would be adequate to attain the NAAQS in that region. In using an example region, it was assumed that NAAQS would be attained in the other AQCR's of the State if the control regulations were applied to similar sources. The problem with the use of an example region is that it can result in excessive controls, especially in the utilization of clean fuels, for areas of the State where sources would not otherwise contribute to NAAQS violations. For instance, a control strategy based on a particular region or source can result in a regulation requiring 1 percent sulfur oil to be burned state-wide where the use of 3 percent sulfur coal would be adequate to attain NAAQS in some locations.

EPA anticipates that a number of States will use the review findings to assist them in making the decision whether or not to revise portions of their State Implementation Plans. However, it is most important for those States which desire to submit a revised plan to recognize the review's limitations. The findings of this report are by no means conclusive and are neither intended nor adequate to be the sole basis for SIP revisions; they do, however, represent EPA's best judgment and effort in complying with the ESECA requirements. The time and resources which EPA has had to prepare the reports has not permitted the consideration of growth, economics, and control strategy tradeoffs. Also, there has been only limited dispersion modeling data available by which to address individual point source emissions. Where the modeling data for specific sources were found, however, they were used in the analysis.

The data upon which the reports' findings are based is the most currently available to the Federal Government. However, EPA believes that the States possess the best information for developing revised plans. The States have the most up-to-date air quality and emissions data, a better feel for growth, and the fullest understanding for the complex problems facing them in the attainment and maintenance of air quality standards. Therefore, those States desiring to revise a plan are encouraged to verify and, in many instances, expand the modeling and monitoring data supporting EPA's findings. In developing a suitable plan, it is suggested that States select control strategies which place emissions for fuel combustion sources into perspective with all sources of emissions such as smelters or other industrial processes. States are encouraged to consider the overall impact which the potential relaxation of overly restrictive emissions regulations for combustion sources might have on their future control programs. This may include air quality maintenance, prevention of significant deterioration, increased TSP, NO_x, and HC emissions which occur in fuel switching, and other potential air pollution problems such as sulfates .

Although the enclosed analysis has attempted to address the attainment of all the NAAQS, most of the review has focused on total suspended particulate matter (TSP) and sulfur dioxide (SO_2) emissions. This is because stationary fuel combustion sources constitute the greatest source of SO_2 emission and are a major source of TSP emissions.

Part of each State's review was organized to provide an analysis of the SO_2 and TSP emission tolerances within each of the various AQCRs. The regional emission tolerance estimate is, in many cases, EPA's only measure of the "over-cleaning" accomplished by a SIP. The tolerance assessments have been combined in Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for revising emission limitation regulations. In conjunction with the regional analysis, a summary of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendix C, D, and E.

The State Implementation Plan Review has addressed the emissions from fuel combustion sources in each of Arkansas' seven AQCRs. For the reader's convenience a map showing Arkansas and its AQCRs is shown on page 6.

The major findings of this review are as follows:

- As required by Section IV of ESECA, the Implementation Plan for the State of Arkansas has been reviewed with particular attention to the most frequent causes of overly restrictive emission limiting regulations. It does not appear that regulations for TSP and SO_2 are overly restrictive, however the formats of the regulations do not lend themselves to definitive analysis of restrictiveness. Arkansas' particulate and SO_2 regulations specify a maximum ambient concentration and/or a maximum fallout rate to be observed beyond the premises of a source. As a result, it is not possible to determine whether observed air quality is due to regulations which could limit the use of certain fuels, or to an otherwise specific level of emissions.

- With the possible exception of the Arkansas AQCR, there are indications of a widespread particulate problem throughout the State. Air quality data, combined with the current plans for air quality maintenance in the Central Arkansas AQCR, suggest that any increase of emissions in the State would only aggravate the current TSP situation.

- This review finds no indication that SO_2 NAAQS are being violated. However, because the restrictiveness of the State's SO_2 regulation cannot be evaluated, it is not known if Arkansas' low ambient SO_2 levels are the result of an overly restrictive control of emissions, a low level sulfur content of the fuel used, or to some other factor such as meteorology.

- There are no indications that Arkansas' major stationary sources use solid fossil fuels. None of the State's nine power plants have been designed to utilize such fuels, but six plants had experience of using both oil and gas in 1973. Only nine of Arkansas' 53 fuel burning industrial sources show a capability to use oil in additional to natural gas. This fact may limit the potential for effective fuel switching in the industrial sector.

- On a statewide basis, natural gas is the major fuel used in Arkansas' stationary fuel combustion sources. It accounts for approximately 58% of the hourly heat input to this type of facility. Oil is the next most used fuel and it provides about 30% of the State's hourly heat input. Wood and wood wastes provide the rest of the State's hourly heat input.

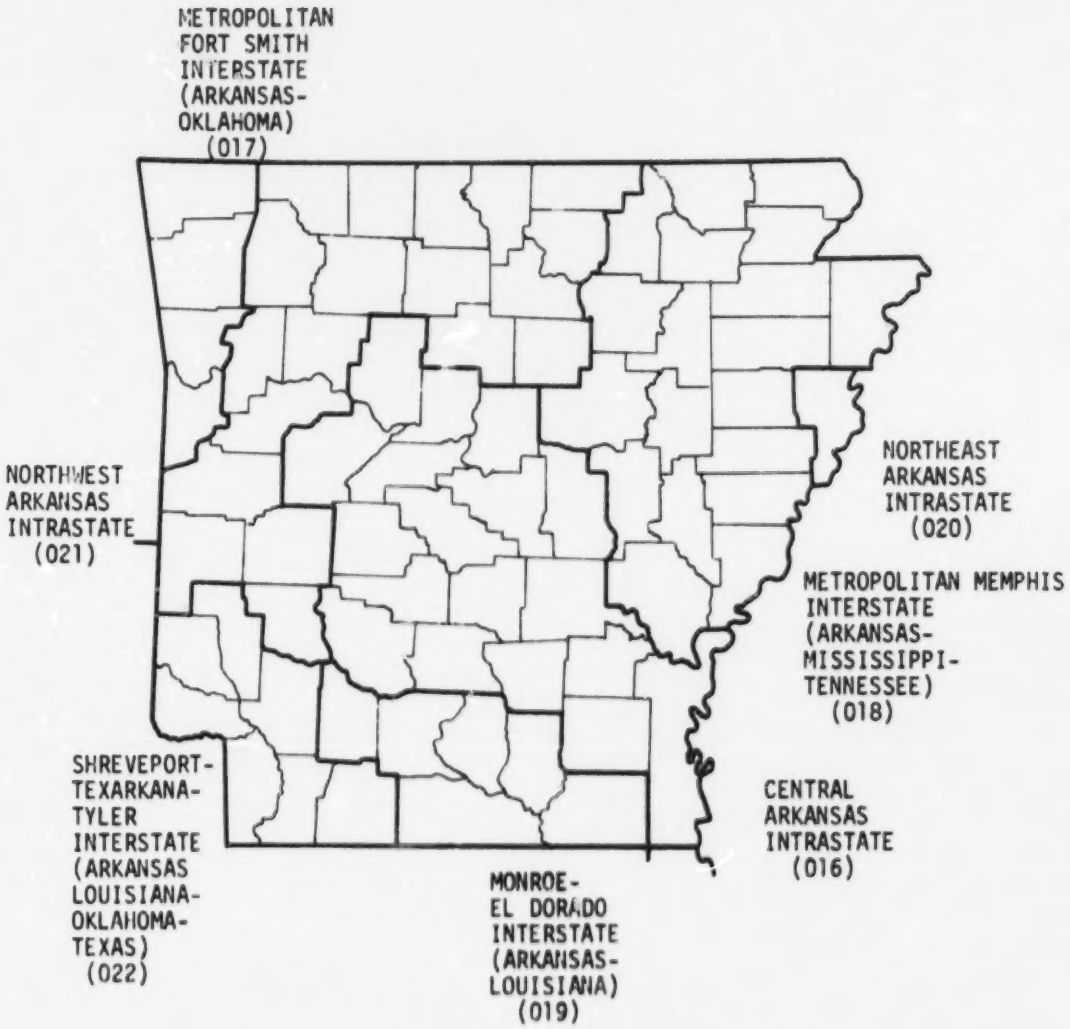

Figure 1. Air Quality Control Regions in Arkansas

2.0 STATE IMPLEMENTATION PLAN REVIEW

2.1 SUMMARY

A revision of fuel combustion source emissions regulations will depend on many factors. For example:

- Does the State have air quality standards which are more stringent than NAAQS?
- Does the State have emission limitation regulations for control of (1) power plants, (2) industrial sources, (3) area sources?
- Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?
- Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy.
- Are there no proposed Air Quality Maintenance Areas?
- Are there indications of a sufficient number of monitoring sites within a region?
- Is there an expected 1975 attainment date for NAAQS?
- Based on reported (1973) Air Quality Data, does air quality meet NAAQS?
- Based on reported (1973) Air Quality Data, are there indications of a tolerance for increasing emissions?
- Is the fraction of total emissions from stationary fuel combustion sources higher than those of other sources?
- Do modeling results for specific fuel combustion sources show a potential for a regulation revision?
- Must emission regulations be revised to accomplish significant fuel switching?
- Based on the above indicators, what is the potential for revising fuel combustion source emission limiting?
- Is there a significant clean fuels savings potential in the region?

This report is directed at answering these questions. An AQCR's potential for revising regulations increases when there are affirmative responses to the above.

The initial part of the SIP Review Report, Section 2 and Appendix A, was organized to provide the background and current situation information for the State Implementation Plan. Section 3 and the remaining Appendices provide an AQCR analysis which helps establish the overall potential for revising regulations. Emission tolerance estimates have been combined in Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for revising emission limiting regulation. In conjunction with the regional analysis, a characterization of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendices C, D and E.

Based on an overall evaluation of EPA's current information, AQCRs have been classified as "good," "marginal," or "poor" candidates for regulations revisions. These ratings, which are shown in the Summary Table on page 10 were determined by assessing the following criteria:

Good	Poor	Marginal
1) Adequate number of air monitoring sites	1) Violation of NAAQS	1) No air quality data or insufficient number of monitoring sites
2) No NAAQS violations	2) Attainment date for NAAQS later than 1975	2) Inconsistent "indicators"
3) Attainment date of 1975 for NAAQS in the SIP	3) Proposed AQMA	
4) No proposed AQMAs	4) Modeling results show no potential for regulation revision	
5) Modeling results show a potential for revision		

For an AQCR to be rated as a good candidate, all of the criteria listed under "Good" would have to be satisfied. The overriding factor in rating an AQCR as a poor candidate is a violation of either the primary or secondary National Ambient Air Quality Standards during 1973. However, if any of the other conditions listed under "Poor" exists, the AQCR would

still receive that rating. The predominant reason for a marginal rating is a lack of sufficient air quality data. Marginal ratings are also given when there are varying or inconsistent "indicators."

After a candidacy has been given to a region, a follow-up analysis should be conducted depending on the rating. A region that has been indicated to be a good candidate for regulation revision should be examined in more detail by the state and the regional office of the EPA, including an examination of current air quality, emissions, and fuel use data, with which the state has more familiarity. If the state feels that clean fuels could be saved in a region rated marginal, then an analysis of air quality data that may have become available since this report should be examined. If current data do not indicate a potential for regulation revision then further study would not be warranted. An AQCR that has been indicated to be a poor candidate would not warrant further study unless the state feels that new information has become available indicating that the poor rating is no longer valid.

"INDICATORS"	STATE		Central Arkansas AQCR 016		Metro Fort Smith AQCR 017		Metro Memphis AQCR 018		Monroe El Dorado AQCR 019		Northeast Arkansas AQCR 020		Northwest Arkansas AQCR 021		Shreveport-Texarkana-Tyler AQCR 022	
	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2
• Does the State have air quality standards which are more stringent than NAAQS?	No	No	N/A	N/A												
• Does the State have emission limiting regulations for control of: 1. Power plants 2. Industrial sources 3. Area sources	Yes[1] Yes[2] N/A[2]	Yes[1] Yes[3] Yes[3]														
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?	Yes	Yes														
• Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?	Yes[4]	Yes[4]														
• Are there no proposed Air Quality Maintenance Areas?			No	Yes	Yes[5]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Are there indications of a sufficient number of monitoring sites within a region?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Is there an expected 1975 attainment date[6] for NAAQS?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Based on reported (1973) Air Quality Data, does air quality meet NAAQS?			No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes[7]	Yes	No	Yes
• Based on reported (1973) Air Quality Data, are there indications of a tolerance for increasing emissions?			No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes[8]	Yes	No	Yes
• Are the total emissions from stationary fuel combustion sources lower than those of other sources?			Yes	Yes	Yes	Yes	Yes	Yes	No[9]	Yes	Yes	No	Yes	No	Yes	Yes
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?			NO MODELING RESULTS AVAILABLE FOR SPECIFIC FUEL COMBUSTION SOURCES — 0													
• Must emission regulations be revised to accomplish significant fuel switching?			N/A[10]	No[11]	N/A[10]	No[11]	N/A[10]	No[11]	N/A[10]	No[11]	N/A[10]	No[11]	N/A[12]	No[11]	N/A[10]	No[11]
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?			Poor[13]	14	Poor[13]	14	Poor[13]	14	Poor[13]	14	Poor[13]	14	Good[15]	14	Poor[13]	14
• Is there a significant Clean Fuels Saving potential in the region?			No[17]	Yes	No[17]	No[18]	No[17]	No[19]	No[17]	Yes	No[17]	Yes	Yes[20]	Yes[20]	No[17]	Yes[21]

See Footnotes on following page.

STATE IMPLEMENTATION PLAN REVIEW - ARKANSAS (SUMMARY TABLE) (Continued)

Summary Table Footnotes:

[1]This is in terms of an ambient concentration observed beyond the premises on which the source is located.

[2]This question is not answerable with a simple "yes" or "no" response, mainly because of contradictory information. First, the SIP states that area sources would be subject to the particulate emission limiting regulation. The subsection of the particulate regulation which has been described as the most stringent supports this statement in that it applies to all equipment capable of causing the emission of air contaminants. Thus, area sources would seem to be covered. However, a graph in another subsection (7(b)) of the particulate regulation implies that sources with potential emission rates (i.e., uncontrolled), less than 10 lbs/hour are not controlled. Furthermore, in sub-section 7(e), various area sources associated with residences were specifically exempted from the controls imposed by the particulate regulation.

[3]Since Arkansas' regulation covering the emission of SO_2 applies to any equipment capable of causing the emission of sulfur compounds, (except that equipment used as a mode of transportation), it would appear that area sources would be covered.

[4]The Arkansas Air Pollution Control Code was revised on January 26, 1972 to allow for the possible non-compliance with the State's emission regulations that may result when a lack of natural gas forced a change to some other (dirtier) fuel. It does not appear that this change was initiated because of EPA's Clean Fuels Policy.

[5]This AQCR had originally been proposed as an AQMA for TSP, but based on recent thinking of EPA - Region VI, it is unlikely that it will be promulgated.

[6]These responses are based on information gathered at the time the Plan was approved from data published in the Federal Register. EPA and the State of Arkansas are currently evaluating the prospect of revising these dates.

[7]Though the particulate levels in this AQCR do not constitute a NAAQS violation, it should be noted that the second highest 24 hour measurement is only one ug/m^3 below the secondary TSP standard.

[8]The tolerance for increased emissions is small; only 100 tons/year.

[9]This is for the Arkansas portion only. For the AQCR as a whole, the fuel combustion from stationary sources accounts for less than 50% of the region's emissions.

[10]Since it cannot be determined whether the emission regulations are being violated or not, this question is not answerable.

[11]Even though it cannot be determined whether sources are in compliance with the emission regulation, air quality data suggests that significant fuel switching could be accomplished without relaxing the regulation. The validity of this statement is based on the assumption that the State's SO_2 regulation is being rigidly enforced.

[12]The power plant in this AQCR used residual oil and gas in 1973. Based on air quality it is estimated that this plant could switch from 60% to 100% residual oil use (based on hourly heat input) and still not surpass the region's small tolerance for increased particulate emissions (100 tons/yr).

[13]Due to the NAAQS violations in this AQCR, there are indications of little potential for TSP regulation relaxation.

[14]Based on air quality, there are indications of increasing the SO_2 emissions in this AQCR. However, it is impossible to determine whether the low ambient SO_2 levels are due to a low emission rate, low sulfur content in the fuels being used, or to overly restrictive SO_2 regulations.

[15]Based on air quality, there are indications of increasing particulate emissions in this AQCR up to the limit of this region's tolerance. However, due to the property line format of Arkansas' regulation, it is impossible to determine whether the observed particulate levels are the result of a low emission rate, or an overly restrictive particulate regulation.

[16]The extent to which a region has a potential for Clean Fuel Savings is dependent on the air quality of that region, and the number of sources in the region which have a dual fuel capability.

[17]Due to NAAQS violations, there seems to be no potential for Clean Fuel Savings which involve increases in TSP emissions.

[18]This AQCR has only one major fuel combustion source, and it uses wood only.

[19]This AQCR has no major fuel combustion sources.

[20]This AQCR has one 60 Mwe power plant, and it had both oil and gas experience in 1973. Industrial sources in this AQCR burn either wood or bagasse solely. See Footnote #12 above for an approximation of the Clean Fuel Savings potential of the power plant in the region.

[21]This AQCR has one 150 Mwe power plant with oil and gas capability, plus one industrial source which uses wood and gas.

2.2 AIR QUALITY SETTING FOR THE STATE OF ARKANSAS

The State of Arkansas is one of five States in EPA Region VI (the others are Louisiana, New Mexico, Oklahoma and Texas). Arkansas is divided into seven AQCRs. These are listed below:

016 - Central Arkansas Intrastate
017 - Metropolitan Fort Smith Interstate
018 - Metropolitan Memphis Interstate
019 - Monroe - El Dorado Interstate
020 - Northeast Arkansas Intrastate
021 - Northwest Arkansas Intrastate
022 - Shreveport-Texarkana-Tyler Interstate

Tables A-1, A-2 and A-3 summarize information which characterizes the air quality, and provides other related parameters in the AQCRs. In Table A-1 the following information is presented:

1) Priority classifications for the pollutants under study

2) Demographic data

3) Counties within the State which are proposed Air Quality Maintenance Areas (AQMAs).

Priority classifications give an indication of the extent to which certain pollutants pose air quality problems for the AQCR. A Priority I listing indicates that relatively high ambient concentrations have been either observed, estimated (in the absence of adequate measured air quality data), or predicted (due to the expected presence of future sources). A Priority III designation is used when pollutant concentrations are generally lower than NAAQS.

With respect to the pollutants under study, Table A-1 shows Metropolitan Memphis AQCR (018) as the only Priority I AQCR for particulates. Four of the other AQCRs have Priority II designations for TSP, while the remaining two are Priority III. All of the State's AQCRs are designated Priority III for both SO_x and NO_x.

Proposed Air Quality Maintenance Area (AQMA) designations are a means of identifying those areas in the State which, due to current air quality

and/or projected growth rate, may have the potential for exceeding any national standard within the ten year period 1975-1985. These designations have been proposed by either the State or by EPA. The Little Rock-North Little Rock areas have been proposed as AQMAs for TSP.

Table A-2 presents the dates when the ambient level of the pollutants under study are expected to be within the limits set by NAAQS. These dates were established at the time the original SIP was approved; however, in some cases, EPA and the State are currently considering amending these dates.

Table A-3 shows a summary of the federal ambient air quality standards for the pollutants under study. The Arkansas SIP references these air quality standards, making the State standards identical to NAAQS.

The data in Tables A-4 and A-5 provide a more detailed picture of the State's recent (1973) air quality setting. Table A-4 shows the Northeast Arkansas AQCR (020) having the highest TPS reading. The Table also shows particulate matter problems, with NAAQS violations occurring in all AQCRs except the Northwest Arkansas AQCR.

The SO_2 air quality data presented in Table A-5 shows generally low values with the highest Arkansas readings being recorded in the Metropolitan Memphis AQCR.

The most current data available (namely 1972 emissions obtained from NEDS data bank, December 1974) was used to compile the particulate and SO_2 emissions, respectively. From Table A-7 it can be seen that 51.3% of the particulate emissions produced within the State originate in the Central Arkansas AQCR (016). The second highest emissions (22%) are contributed by the Northeast Arkansas AQCR (020). Most of the State's particulate emissions are derived from sources other than fuel combustion. The Arkansas portion of the Monroe-El Dorado AQCR (019) is the only area in which fuel combustion accounts for more than half of that area's particulate emissions. Table A-8 shows that SO_2 emissions in Arkansas come from basically three AQCRs, Northeast Arkansas, Central Arkansas, and the Arkansas portion of Monroe-El Dorado AQCRs. Respectively, these areas contribute 35% 22%, and 22% of the SO_2 emissions produced within the State of Arkansas. In

two AQCRs (Northwest and Northeast Arkansas), significant proportions of these emissions result from fuel combustion processes (82.5% and 70.7% respectively). In each of the remaining AQCRs, the amount of SO_2 emissions that result from fuel combustion ranges between 38.9% and 16.3%.

The Arkansas SIP contains a particulate emissions inventory for the Central Arkansas AQCR (016) which shows the emissions that existed in 1970, and those that would be expected after implementation of the control strategy. This information is shown in Table A-9 for the purpose of comparing 1970 emissions data with the 1972 data shown in Table A-7. These emissions are presented in such a manner that the contribution from Pulaski and Saline Counties (which are the State's major emitters of particulate matter) can be viewed separately.

The information shows that fuel combustion from stationary sources accounted for only 2% of the AQCR's 1970 particulate emissions. Though there is a discrepancy between this value and the magnitude of the corresponding figure from Table A-7, both are consistent in that they support the conclusion that fuel combustion was an unimportant source of particulate emissions in the Central Arkansas AQCR during both 1970 and 1972.

The SIP contained no emissions data for SO_2, so there can be no comparison between 1970 and 1972 levels for this pollutant.

2.3 BACKGROUND OF THE DEVELOPMENT OF THE CURRENT STATE IMPLEMENTATION PLAN

Arkansas' SIP is entitled, "The Arkansas Plan of Implementation for Air Pollution Control." It was developed by the Arkansas Department of Pollution Control and Ecology, and was subsequently adopted by the Commission on Pollution Control and Ecology. Several alternative control strategies were considered by State officials, but the one selected for detailed evaluation in the SIP was one based on the statutory and regulatory provisions of the Arkansas Air Pollution Control Code (hereafter referred to as the Air Code). This code has been in effect since July 1969. It was amended in January and July of 1972.

The Air Code includes one set of regulations of general application to be administered in all portions of the State. However, according to the SIP, these regulations contain specific internal mechanisms by which more stringent

controls can be required in those areas where a multiplicity of sources can potentially produce locally adverse effects.

The SIP brings attention to a series of provisions that have been built into the control strategy so as to provide an added margin for NAAQS attainment. This margin is produced by:

1) The use of a conservative value for the TSP background. In this case "conservative" means use of the relatively high value of 40 ug/m^3 (AAM). Use of a high background tends to produce a requirement for more stringent controls.

2) Applying the emission reductions of the Air Code only to those sources that involve process losses during the evaluation of the control strategy.

3) The inclusion of emissions from some of the smaller point sources into the area source category, and then assume that all emissions from the area source category would be uncontrollable. This was done in spite of the SIP's indication that area sources will be controlled.

4) Granting operation permits only if State is convinced that the facility in question will not cause a violation of the Air Code, or NAAQS. Furthermore, the applicant has to show that the equipment to be used incorporates existing advances in control technology, for the air pollutants involved.

The SIP states that the combination of the margins of safety, and the State's ability to require more stringent controls when necessary all serve to provide adequate assurances that NAAQS can be attained and maintained throughout the State regardless of future industrial and demographic patterns. Only two possible problems that may threaten the attainment of this goal are indicated. They are 1) the unavailability of natural gas as a major fuel for power generation, and 2) the extent to which some of the particulate sources are not accounted for in the emissions inventory.

For the development of the State's control strategy, the Example Region approach was used. The State's most populated and most heavily industrialized area (Saline and Pulaski Counties) was used for this purpose. These two counties comprise only 12% of the Central Arkansas AQCRs' nineteen county area but they produced more than 50% of the AQCRs' 1970 particulate emissions. This is shown in Table A-9.

While the Central Arkansas AQCR is designated Priority II for particulates, another AQCR (namely Metropolitan Memphis Interstate (018)), has a Priority I designation for this pollutant. However, this AQCR's Priority I classification is mostly the result of emissions produced in the large metropolitan and industrial area of Memphis, Tennessee. The SIP indicates that the air pollution control agencies for the other States involved in this AQCR expect control of sources under their jurisdiction, and therefore, decrease the incidence of NAAQS violations within the Arkansas portion of the AQCR.

The evaluation of the State's control strategy consisted of basically two steps. First, the appropriate emission limiting provisions of the Air Code were applied to 1970 emissions in the example region to determine the level of emissions that would result when selected sources were controlled (see Table A-9). These controlled emission levels were then used as inputs for the Air Quality Display Model (AQDM). This model provides estimates of the air quality that would be expected, given certain emission levels within an area. Using this method of analysis, an ambient annual geometric mean (AGM) for TSP of less than 50 ug/m^3 was projected for 1975 within the Saline and Pulaski Counties area. Since the national secondary TSP standard is 60 ug/m^3 (AGM), the above finding demonstrates NAAQS attainment in this area.

The ambient SO_2 concentrations projected using AQDM techniques were below the levels set by NAAQS. The measured SO_2 levels (of approximately 10 ug/m^3) as shown in Table A-6 were also below the national standard for this pollutant. Because of these low SO_2 levels, Arkansas was not required to prepare a control strategy for this pollutant.

A summary of the State's regulations that apply to particulate and SO_2 emissions from fuel burning equipment is presented in Table A-10. The particulate regulation corresponds to Section 7 of the Air Code, while the SO_2 regulation is Section 8.

The SO_2 regulation has two sub-sections; the first one sets the maximum ambient concentration limit (as shown in Table A-10), while the second sub-section indicates that this maximum concentration can be determined by

either ambient sampling, or via applying dispersion formulas to stack concentrations. This second sub-section is not shown in Table A-10.

The particulate regulation is more complex and involved. It has six sub-sections. The first and second (7(a) and 7(b)) seem to be the only ones which set limits for fuel burning equipment. These are shown in Table A-10. The first sub-section is similar to the SO_2 regulation in that it sets limits for all equipment capable of emitting air contaminants. It stipulates the maximum ambient concentrations and maximum amounts of particulate fallout allowed. The SIP states that experience shows this to be the most stringent sub-section of the regulation.

While the SIP also implies sub-section 7(b) applies to all equipment, this portion of the regulation (as written) applies only to equipment which has been installed, altered, or replaced after the effective date of the Air Code. (Section 19 of the Air Code indicates that this date is July 7, 1972.) This sub-section uses a graph (shown in Figure A-2) that relates the allowable emission level to the potential emission rate. This latter term is defined as the total weight rate of particulate emissions for any air contamination source which is operating at maximum rated capacity, and which has no air control apparatus installed. When a number of such sources (each of which is capable of being operated individually) are manifolded together so that their emissions are discharged to a single flue, the potential emission rate and allowable emission rate for each source shall be determined individually.

Two other sub-sections (7(c) and 7(d)) of the particulate regulation apply specifically to manufacturing equipment and asphalt mix plants respectively. An industry for which the limits of sub-section 7(a) are unduly restrictive, can opt to be subject to be the limits imposed by sub-section 7(c). However, in that this sub-section specifically excludes gaseous and liquid fuels, only those fuel burning facilities using wood could possibly be considered. (Available data shows no fuel burning facilities within Arkansas which utilize coal.)

Sub-section 7(e) concerns exemptions to the regulations in relation to visible emissions. Of importance to this review is the exemptions provided for: outdoor fireplaces connected with residences, non-commercial food preparation,

and the use of incinerators and heating equipment in residential dwellings for not more than four families. Thus, these area sources are not covered by particulate limiting regulations.

Sub-section 7(f) refers to the utilization of methods and formulas for projecting parameters such as (1) effective stack height, (2) maximum concentration downwind from the source of emission irrespective of concentrations of particulate matter in the atmosphere from sources other than that of the applicant's and (3) distance from source at which maximum concentration will occur.

2.4 SPECIAL CONSIDERATIONS

It is impossible, within the context of this review, to accurately determine the extent to which these sources are in compliance with the applicable regulations. And for this reason, it is also impossible to definitively evaluate the restrictiveness of these regulations. This situation is in large, due to the format of Arkansas' emission regulations for particulates and SO_2. The regulations were not specifically designed to apply to fuel burning equipment; neither of them were stated in the manner normally used for this type of equipment, (that is, by prescribing the number of pounds of pollutant that can be emitted for every 10^6 Btu of energy produced). Sub-section 7(a) of the particulate regulation and the SO_2 regulation are both stated in terms of ambient concentration observed at any point beyond the premises where the source is located. Regulations written in this format are sometimes referred to as "property line regulations," and often have inherent enforcement problems. The entire situation is further complicated by the fact that sub-section 7(b) is not applicable to all equipment, but rather only to equipment which has been installed after the effective date of the regulation.

Without additional detailed information on each source, it would be impossible to accurately and efficiently determine which of the sources are covered by this sub-section. For these reasons, sub-section 7(b) has little usefulness for evaluative purposes within the context of this review. However, even though this situation allows for little to be said directly about the restrictiveness of the State's regulations, available information

does allow for comment on the possible effects of regulation relaxation. This topic will be dealt with in Section 3 of this review.

In addition to the regulations listed in Table A-10, the Air Code contains other regulations which relate to fuel burning sources. The first of these is sub-section 3(f) in the Air Code which requires the use of state-of-the-art technology in all equipment for which a permit is necessary. It also requires fuel burning equipment to operate in a manner such that optimum combustion is achieved. Sub-section 3(d) indicates that in addition to other specified equipment, operating permits are not required for 1) gas fuel and No. 1 and No. 2 fuel oil burning equipment used for space heating, service water heating and electric power generation (less than 60,000 lbs/hour steam capacity) and 2) for fuel-burning, refuse-burning and cooking equipment used in connection with a structure designed and used exclusively as a dwelling for not more than four families.

A sub-section of another regulation, (Section 13(b) in the Air Code) makes allowances for the possibility of periods of non-compliance with the Air Code due to a forced change of fuels, or lack thereof. According to the SIP, this sub-section was the result of a January 1972 amendment to the Air Code, and though not specifically mentioned, its intent revolves primarily around the change from natural gas to another (dirtier) fuel due to the diminishing supply of the former.

The fact that an AQMA designation for TSP has been proposed for the Little Rock-North Little Rock area has been mentioned earlier. Any changes to the State's SIP that may result from a formal designation of this area may be of importance to the content and conclusions of this review, and therefore, would be additional special considerations.

At the time the plan was approved, the Fort Smith Standard Metropolitan Statistical Area (SMSA) in the metropolitan Fort Smith AQCR was listed as a proposed AQMA for particulates. But based on recent thinking of EPA Region VI, it appears unlikely that this area will be promulgated.

The attainment dates shown in Table A-2 were based on information published in the Federal Register. However, after a recent analysis of air quality data, EPA and the State of Arkansas are currently evaluating the prospect of revising these dates.

3.0 AQCR ASSESSMENTS

3.1 REGIONAL AIR QUALITY

Tables A-11 and A-12 present the results when the proportional model is used with 1973 air quality data to estimate tolerance for emissions increase. This display should be viewed in light of the limitations mentioned in Section 1.0. The portion of these tables that apply to SIP information was included as a means of summarizing the emission control goals of the State. However, Arkansas' SIP contained the necessary detailed data for only the Central Arkansas AQCR, therefore, comparisons can be made in this region only.

Tables B-1 and B-2 are summaries of a number of the indicators which should be considered when estimating the potential for regulation relaxation.

Based on the information presented in Tables A-11 and B-1, any increases in particulate emissions would tend to aggravate an air quality situation which is typified by TSP violations in all except one of the State's AQCRs.

Each of Arkansas' AQCRs have a tolerance for increased SO_2 emissions without violating NAAQS (see Table A-12 and B-2). To determine an allowable level of increased emissions would require an analysis involving diffusion modeling. However, it should be noted that most of the fuel switches that could generally be utilized for increasing SO_2 emissions (i.e., use of residual oil, high sulfur oil, or coal instead of gas) would also produce corresponding increases in particulate emissions, and thus further aggravate the State's TSP situation.

While the Central Arkansas AQCR (016) was used as the Example Region for the development of the State's control strategy for particulates, it is worthwhile to note that 1973 data shows the highest annual and 24 hour TSP readings occurring in the Northeast Arkansas AQCR (020). In fact, the ambient TSP air quality in the Central Arkansas AQCR is better than the corresponding air quality in a variety of the other AQCRs. The cause for these high TSP levels in AQCRs other than the Example Region is possibly due to fugitive dust emissions.

3.2 STATEWIDE FUEL USE FOR POINT SOURCES

Table B-3 shows the major fuels in the State can be categorized as natural gas, oil and wood. Included in this last category is bagasse, the cellulose material that remains after the processing of sugar cane. It should be noted that the figures involving the wood category in Table B-3 are based on the assumption that materials in this category have an average heat content of 5000 Btu/lb. The heat values of materials in this category vary widely depending on their composition and moisture content. The heat contents for relatively dry wood typically range between 6000 and 8000 Btu/lb, the 5000 Btu/lb figure appears to be a relatively conservative estimate. Due to the variability of heat values, moisture content, and resultant emissions of the individual fuels in this category, the 5000 Btu/lb estimate has been used solely in those calculations aimed at providing a first approximation of the relative importance of these materials as fuels within Arkansas.

3.3 POWER PLANT ASSESSMENT

The tables that comprise Appendix C provide a listing of the power plants in the State along with a general description of each plant's emission characteristics. This listing and information was obtained from the NEDS data on individual sources.

As shown in Table C-1, Arkansas has a total of nine power plants. Information from the Steam-Electric Plant Factors publication show that their installed generating capacity varies from 27.7 megawatts electric (Mwe) to 869.6 Mwe. The State's total capacity is 2405 Mwe. It is somewhat surprising to note that 47.7% of this generating capacity was produced in the Northeast Arkansas AQCR (020), while only 37.8% was produced in the Example Region.

The State's largest generating capacity power plant (869.6 Mwe) is located in the Northeast Arkansas AQCR and it has a total hourly heat input of 3715×10^6 Btu. The State's next largest power plant is in the Central Arkansas AQCR. (Generating capacity is 693.6 Mwe and heat input is 3742×10^6 Btu/hour.) The Steam-Electric Plant Factors publication indicates that six of Arkansas' nine power plants were designed to utilize gas and/or

oil as a fuel, while the remaining three plants were designed for gas only. However, this publication also presents information showing that these three plants had both oil and gas experience in 1972. Federal Power Commission (FPC) fuel schedules for 1973 did not include data for one of these plants, but it did corroborate the dual fuel use for the other two. As indicated by the information in Table B-3, natural gas accounts for 51% of total hourly heat input to the State's power plants, with oil providing the remaining 49%.

The Northeast Arkansas AQCR contains four of the State's nine power plants. Most (60%) of the hourly heat input to these plants is obtained from the combustion of oil. This is quite different from the situation in the Central Arkansas AQCR where 59% of the hourly heat input to power plants comes from natural gas. Thus assuming the absence of control equipment (which, according to NEDS data is generally the case for Arkansas' power plants), one would expect the overall emission level from power plants in the Northeast Arkansas AQCR to be higher than the corresponding levels in the Central Arkansas AQCR.

The fact that all except one of the State's power plants have a dual fuel capability increases the potential feasibility of fuel switches aimed at clean fuel savings. The Northwest Arkansas AQCR (021) is the only AQCR which has a tolerance for accepting additional particulate emissions. There is only one power plant in this AQCR, and it did have both oil and gas experience in 1973. Information in the Table C-1 for this AQCR shows that, based on the plant's oil burning experience, the plant oil could be substituted for its 1973 supply of natural gas, and still not surpass the 100 ton/yr tolerance for increased particulate emissions calculated for this AQCR. Any fuel switches which increase SO_2 emissions would have to be done in a way so that particulate emissions are not increased.

3.4 INDUSTRIAL/COMMERCIAL/INSTITUTIONAL SOURCE ASSESSMENT

Table D-1 presents the pertinent fuel combustion data for point sources in the industrial/commercial/institutional sector (commonly referred to as the industrial sector in this review). This information was obtained from NEDS emission data for the individual sources.

As shown in Appendix D, there are a total of 53 specific industrial fuel burning sources within the State of Arkansas. Thirty-four of these use wood only, nine use only gas, one uses bagasse, and the remaining nine use a combination of either two or three of these fuels. In this last category three sources use oil, gas and wood; another three use both gas and wood, and the remaining three use oil and gas only. Industrial sources are the only major stationary fuel burning installations in the State which utilize wood as a fuel. Lumber, paper, and furniture companies make up the bulk of this group that uses wood.

Twenty-six of the State's 53 industrial sources are located in the Central Arkansas AQCR. Nineteen of these use wood only, and four use only natural gas. The remaining three use a combination of fuels.

Within the industrial sector, the bulk of the heat input to stationary fuel burning equipment comes from natural gas. Wood and wood waste products provide the next largest segment, while oil provides the remaining portion of the heat input to the State's industrial equipment. Using the 5000 Btu/lb heat content estimate for wood, (as was done in Table B-3), the contributions of the various fuels to the total hourly heat input of Arkansas's industrial equipment would be as follows:

natural gas	67%
wood	24%
oil	9%

Because of the uncertainty associated with the 5000 Btu/lb figure, the above percentages should not be viewed as being absolute, but rather, they represent an approximation of the relative contributions from these fuels.

Though the Central Arkansas AQCR has the largest number of the wood burning industrial sources, it did not account for the largest amount of

wood used in 1972. While a total of 712,180 tons of wood was used as fuel in the Central Arkansas AQCR, 870,570 tons were used in the Arkansas portion of the Monroe-El Dorado Interstate AQCR (019). The AQCR consuming the third largest amount of wood in the State was the Arkansas portion of the Shreveport-Texarkana-Tyler AQCR (022).

With regards to a potential fuel switch to achieve clean fuel savings, only those facilities that have multiple fuel experience should be considered as candidates. Based on available data on the past fuel experience of industrial sources, only nine of the State's 53 sources have this capability. However, it is not known to what extent the various fuels can be interchanged among all pieces of fuel burning equipment at each of these facilities. But assuming complete interchangeability of fuels at these facilities, fuel switches aimed at clean fuel savings could potentially occur in the following AQCRs since these are the only ones which have sources that burn fuels other than natural gas.

Central Arkansas (016)	- one source burning oil, gas, and wood, and two sources burning wood and gas.
Arkansas portion of Monroe-El Dorado (019)	- two sources burning oil, gas and wood, and two sources burning oil and gas.
Northeast Arkansas (020)	- one source burning oil and gas
Arkansas portion of Shreveport-Texarkana-Tyler (022)	- one source burning wood and gas

Since the State's only AQCR which can tolerate increased particulate emissions is not in the above list, fuel switches at Arkansas' industrial sources can be used to accomplish only those clean fuel savings associated with increasing SO_2 emissions. However, because of the State's widespread TSP problems, these fuel switches could not have corresponding increases in particulate emissions.

3.5 AREA SOURCE ASSESSMENTS

Area sources in Arkansas offer little, if any, potential for achieving clean fuel savings within the context of ESECA.

APPENDIX A

- State implementation plan information
- Current air quality information
- Current emissions information

Tables in this appendix summarize original and modified state implementation plan information, including original priority classifications, attainment dates, ambient air quality standards, and fuel combustion emission regulations. SAROAD data for SO_2 and TSP monitoring stations are shown for AQCRs in the State. NEDS emissions data by AQCR[1] are tabulated and broken down into fuel burning categories.

Tables A-12 and A-13 show a comparison of emission inventories in the original SIP and those from the NEDS. An emission tolerance, or emission tonnage which might be allowed in the AQCR and still not violate national secondary ambient air quality standards, is shown for SO_2 and particulates. The intent of this calculation is to indicate possible candidate regions for fuel switching. Tolerance was based on either the degree of control expected by the SIP or upon air quality/emission relationships which are calculated from more recent data. The value of the emission tolerance provides an indication of the degree of potential an AQCR possesses for fuel revisions and regulation relaxation.

Methodology for Increased Emissions Tolerance

A tolerance for increased emissions was determined as follows: The "allowable emissions" were calculated for each AQCR based on 1972 NEDS data and the percent reduction (or increase) required to meet the national secondary ambient air quality standards in that AQCR (worst case from Tables A-4 and A-5).

The percentages used in this calculation were obtained via the use of current 1973 air quality data and the proportional rollback model. The values for background TSP concentrations were the same as those used in the SIP. This background value was used in all calculations involving the annual standard, but a zero TSP background was assumed for the calculation of reductions based on the 24-hour standard. (This was done because background levels are, in effect, an annual average, and therefore, should be

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[1] "1972 National Emissions Report," EPA - 450/2-74-012, June 1974.

compared with only annual data. It is reasonable to expect that the "real background" for any particular 24-hour period to be different for other 24-hour periods.)

The NEDS emissions are subtracted from the "allowables" to determine the tolerance for emissions increase. A positive value for this result indicates a potential for increasing emissions.

When the current air quality levels were less than one-half of the level represented by an ambient air quality standard, no "rollup" emissions tolerance was calculated in Tables A-12 and A-13. This arbitrary cutoff point was chosen so as not to distort the emissions tolerance for an area. At low levels of a pollutant, the relationship between emissions and air quality is probably not linear. Although this cutoff may leave some AQCRs with no quantifiable emissions tolerance, it was felt that no number at all would be preferable to a bad or misleading number.

It is emphasized that emissions tolerance is a region-wide calculation. This tolerance obviously makes more sense in, say, an urban AQCR with many closely spaced emissions sources than in a largely rural AQCR with geographically dispursed emissions.

A word of caution regarding particulates needs mentioning. Emission source estimates in the NEDS data bank and most state SIP's are for total particulates. Generally, the control strategies for particulates are aimed at total particulates, while the high-volume particulate sampling (SAROAD data) measures only the finer, suspended fraction. A given level of total particulate emissions control will therefore not translate into the same level of measured ambient air quality. Some of the larger particulates being controlled will not remain suspended, and therefore would not be measured by the High-volume technique. Hence, particulate control plans may have underestimated the amount of control necessary to achieve ambient air quality standards.

Table A-1. AQCR Priority Classification and AQMAs - ARKANSAS

AQCR	Fed. #	Part.[a]	SO_x[b]	NO_x[c]	Demographic Information[e]			AQMA Designations[d]		
					Population 1970	Square Miles	Population Density	TSP Counties	SO_x Counties	NO_x Counties
Central Arkansas	016	II	III	III	720,687	13,487	53.4	Pulaski and Saline	None	None
Metro.Ft. Smith	017	II	III	III	232,760	2,932	79.4	None	"	"
Metro. Memphis	018	I	III	III	48,106	608	79.1	None	"	"
Monroe-El Dorado	019	II	III	III	129,762	4,610	28.1	None	"	"
Northeast Arkansas	020	III	III	III	474,444	13,266	35.8	"	"	"
Northwest Arkansas	021	III	III	III	194,919	12,830	15.2	"	"	"
Shreveport-Texarkana-Tyler	022	II	III	III	111,269	3,695	30.1	"	"	"

Priority	I Greater than	II From-To	III Less than
[a] Sulfur oxide:			
Annual arithmatic mean..	100	60-100	60
24-hour maximum.....	445	260-455	260
[b] Particulate matter:			
Annual geometric mean...	95	60- 95	60
24-hour maximum.....	325	150-325	150
[c] Nitrogen dioxide	110		110

[d] As indicated in the Proposed Air Quality Maintenance Designations for Arkansas: Background and Rationale, EPA, Region VI.

[e] 1970 U. S. Census Information.

[f] SMSA stands for the Standard Metropolitan Statistical Area designation used in census reports.

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Table A-2. Arkansas Attainment Dates[b]

AQCR #	AQCR Name	Particulates Attainment Dates		Sulfur Dioxide Attainment Dates		Nitrogen Oxides Attainment Dates
		Primary	Secondary	Primary	Secondary	
016	Central Arkansas	7/75	7/75	a	a	a
017	Metro Fort Smith	a	7/75	a	a	a
018	Metro. Memphis	7/75	7/75	a	a	a
019	Monroe-El Dorado	a	7/75	a	a	a
020	Northeast Arkansas	a	a	a	a	a
021	Northwest Arkansas	a	a	a	a	a
022	Shreveport-Texarkana-Tyler	a	7/75	a	a	a

a) Ambient levels were below standards at the time attainment dates were formalized.

b) Based on information gathered at the time the Plan was approved from data published in the Federal Register. EPA and the State of Arkansas are currently evaluating the prospect of revising these dates.

Table A-3. Ambient Air Quality Standards - Arkansas

(Expressed as $\mu g/m^3$)

		Total Suspended Particulate		Sulfur Oxides			Nitrogen Dioxide
		Annual	24-Hr.	Annual	24-Hr.	3-Hr.	
Federal	Primary	75 (G)	260[a]	80 (A)	365[a]	----	100 (A)
	Secondary	60 (G)	150[a]	----	----	1300[a]	100 (A)
State	equivalent to those listed above.						

(G) Annual geometric mean

(H) Annual arithmetic mean

a Not to be exceeded more than once per year
b Assumed to be equivalent to those listed above.

Table A-4 Arkansas AQCR Air Quality Status, TSP [a]

AQCR Name	AQCR #	# Stations Reporting	TSP Concentration ($\mu g/m^3$) Highest Reading Annual	Highest Reading 24-Hr	2nd Highest Reading 24-Hr	# Stations Exceeding Ambient Air Quality Standards Primary Annual	Primary 24-Hr[c]	Secondary Annual	Secondary Annual %	Secondary 24-Hr[c]	Secondary 24-Hr %	% Reduction[d] Required to Meet Standards	Standard on Which % Reduction Is Based
Central Arkansas	016	10	74	620	166	0	0	5	50	2	40	37	annual
Metropolitan - Fort Smith	017[b]	8	63	608	213	1	0	3	38	2	25	49	annual
	(Arkansas)	3	63	271	213	1	0	3	100	2	67	49	annual
Metropolitan- Memphis	018[b]*	20	93	451	269	2	1	3	15	8	40	56	annual
	(Arkansas)	6	90	451	269	1	1	2	33	3	50	56	annual
Monroe- El Dorado	019[b]	8	63	254	200	0	0	1	12	4	50	25	24-hr
	(Arkansas)	5	53	236	200	0	0	0	0	1	20	25	24-hr
Northeast Arkansas	020	24	102	924	603	4	3	5	21	15	62	75	24-hr
Northwest Arkansas	021	2	57	497	149	0	0	0	0	0	0	-1	24-hr
Shreveport-Texarkana Tyler	022[b]	11	81	580	168	1	0	3	27	4	36	47	annual
	(Arkansas)	4	81	560	157	1	0	2	50	1	25	47	annual

[a] 1973 air quality data is National Air Data Bank as of June 7, 1974.

[b] Interstate

[c] Violations based on 2nd highest reading at any station

[d] Formula $\left[\left(\frac{\text{2nd Highest 24 hr - 24 hr Secondary Standard}}{\text{2nd Highest 24 Hr}}\right) \times 100, \left(\frac{\text{Annual - Annual Secondard Standard}}{\text{Annual - Background}}\right)\right]$

Arkansas SIP indicated a TSP background of 40 $\mu g/m^3$ (AAH). This figure would generally correspond to a value 36 $\mu g/m^3$ on a AGM scale.

*other states in this interstate AQCR (Mississippi and Tennessee) are outside Region VI

Table A-5. Arkansas AQCR Air Quality Status (1973), SO_2[a]

AQCR Name	AQCR #	# Stations Reporting 24-Hr (Bubbler)	# Stations Reporting (Contin.)	SO_2 Concentration ($\mu g/m^3$) Highest Reading Annual	Highest Reading 24-Hr	2nd Highest Reading 24-Hr	# Stations Exceeding Ambient Air Quality Stds. Primary Annual	Primary 24-Hr[c]	Secondary 3-Hr	% Reduction[d] Required To Meet Standards	Standard on Which % Reduction Is Based
1. Central Arkansas	016	2	-	-	246	122	0	0	-	e	-
2. Metropolitan	017[b]	3	-	6	62	25	0	0	-	e	-
Ft. Smith	(Ark)	1	-	-	62	25	0	0	-	e	
3. Metropolitan	018[b]	10	1	-	349[f]	769	0	0	0	e	-
Memphis	(Ark)	3	-		290	769	0	0	-	e	
4. Monroe -	019[b]	3	-	2	61	60	0	0	-	e	-
El Dorado	(Ark)	2	-	-	9	9	0	0	-	e	
5. Northeast Arkansas	020	1	-	-	83	61	0	0	-	e	-
6. Northwest Arkansas	021	1	-	-	180	20	0	0	-	e	-
7. Shreveport -	022[b]	7	-	7	25	13	0	0	-	e	-
Texarkana - Tyler	(Ark)	1	-	-	8	2	0	0	-	e	-

[a] 1973 air quality data is National Air Data Bank as of June 7, 1974.

[b] Interstate.

[c] Violations based on 2nd highest reading at any station.

[d] Formula $\left[\left(\frac{\text{2nd Highest 24 Hr - 24 Hr Standard}}{\text{2nd Highest 24 Hr}} \right) \times 100, \left(\frac{\text{Annual - Annual Standard}}{\text{Annual}} \right) \times 100 \right]$

[e] The most adverse air quality reading for this AQCR is less than 1/2 the secondary standard, therefore % reductions were not calculated in order to not mislead the reader with unrealistic percentages.

[f] This high reading was at a single continuous recording station in Mississippi.

[g] Identical readings - a bubbler station in Arkansas

SO_2 - background is assumed to be zero.

Table A-6. Measured Air Quality Data for Central Arkansas AQCR (016)[a]

Site	Pollutant	Sampling Interval	Start Date	End Date	Number of Samples	Maximum 24-hrs	Annual Arith. Mean	Annual Geometric Mean
1	Particulate	24-hr	1-4-69	12-15-69	25	178.0	--	75.3
1	SO_x	24-hr	1-2-70	11-6-70	13	23.0	10.1	--
2	Particulate	24-hr	1-8-69	12-15-69	25	169.0	--	81.8
3	Particulate	24-hr	1970	1970	22	187.0	--	80.0
4	Particulate	24-hr	1971	1971	3	154.0	--	81.0
5	Particulate	24-hr	7-11-71	9-26-71	4	180.0	--	124.0
6	Particulate	24-hr	7-11-71	9-26-71	6	176.0	--	98.0
7	Particulate	24-hr	7-11-71	9-26-71	6	81.0	--	60.0
8	Particulate	24-hr	7-17-71	9-26-71	5	216.0	--	131.0
9	Particulate	24-hr	7-17-71	9-26-71	6	136.0	--	83.0
10	Particulate	24-hr	7-17-71	9-26-71	6	135.0	--	77.0

[a] Information obtained from Appendix I of Arkansas SIP, (Control Strategy Sections)

Table A-7. Arkansas Emission Summary, Particulates[a]

AQCR	Total 10^3 tons/yr	% from Fuel Combustion	Annual Emissions from Fuel Combustion 10^3 tons/yr	Electrical Generation		Other Point Source Fuel Combustion		Area Source Fuel Combustion	
				10^3 tons/yr	% of total	10^3 tons/yr	% of total	10^3 tons/yr	% of total
Central Arkansas (016)	77.9	10.9	8.5	0.5	0.6	6.6	8.5	1.4	1.8
Metro. F. Smith (017)[b]	11.1	9.3	1.034	0	0	0.034	0.3	1.0	9.0
Arkansas Portion	7.4	7.2	0.53	0	0	0.03	0.4	0.5	6.8
Oklahoma Portion	3.7	13.6	0.504	0	0	0.004	0.1	0.5	13.5
Metro. Memphis (018)[b]	18.5	23.2	4.3	0.3	1.6	1.7	9.2	2.3	12.4
Arkansas Portion	0.8	12.5	0.1	0	0	0	0	0.1	12.5
Mississippi Portion	0.5	20.0	0.1	0	0	0	0	0.1	20.0
Tennessee Portion	17.2	23.8	4.1	0.3	1.7	1.7	9.9	2.1	12.2
Monroe - El Dorado (019)[b]	29.8	45.9	13.7	0.3	1.0	12.5	41.9	0.9	3.0
Arkansas Portion	13.6	59.5	8.1	0.1	0.7	7.7	56.6	0.3	2.2
Louisiana Portion	16.2	34.5	5.6	0.2	1.2	4.8	29.6	0.6	3.7
Northeast ARkansas (020)	33.4	8.0	2.7	0.7	2.0	0.6	1.8	1.4	4.2

[a] 1972 emissions in data bank as of June 27, 1974

[b] Interstate

Table A-7. Arkansas Emission Summary, Particulates[a] (Contd)

AQCR	Total 10^3 tons/yr	% from Fuel Combustion	Annual Emissions from Fuel Combustion 10^3 tons/yr	Electrical Generation		Other Point Source Fuel Combustion		Area Source Fuel Combustion	
				10^3 tons/yr	% of total	10^3 tons/yr	% of total	10^3 tons/yr	% of total
Northwest Arkansas (021)	10.7	13.4	1.4	0.07	0.7	0.06	0.6	1.3	12.1
Sheveport-Texarkana-Tyler (022)[b]	162.7	5.7	9.3	0.96	0.6	6.0	3.7	2.3	1.4
Arkansas Portion	8.1	27.9	2.3	0.06	0.7	1.9	23.5	0.3	3.7
Louisiana Portion	53.2	9.5	5.2	0.1	0.2	3.9	7.3	1.2	2.3
Oklahoma Portion	1.1	18.2	0.2	0	0	0	0	0.2	18.2
Texas Portion	100.3	1.6	1.6	0.8	0.8	0.2	0.2	0.6	0.6
EMISSION TOTALS	344.1		40.9	2.83		27.5			
(ARKANSAS TOTALS ONLY)	151.9		23.6	1.43		16.9			

Table A-8. Arkansas Emission Summary, SO_2[a]

AQCR	Total 10^3 tons/yr	% from Fuel Combustion	Annual Emissions from Fuel Combustion 10^3 tons/yr	Electrical Generation		Other Point Source Fuel Combustion		Area Source Fuel Combustion	
				10^3 tons/yr	% of total	10^3 tons/yr	% of total	10^3 tons/yr	% of total
Central Arkansas (016)	9.6	39.5	3.8	2.1	21.8	1.0	10.4	0.7	7.3
Metro. Ft. Smith (017)[b]	1.6	25.2	0.403	0	0	0.003	0.2	0.4	25.0
Arkansas Portion	1.1	27.6	0.303	0	0	0.003	0.3	0.3	27.3
Oklahoma Portion	0.5	20.0	0.1	0	0	0	0	0.1	20.0
Metro. Memphis (018)[b]	80.7	90.3	72.9	69.0	85.5	0.6	0.7	3.29	4.1
Arkansas Portion	0.2	20.0	0.04	0	0	0	0	0.04	20.0
Mississippi Portion	0.2	25.0	0.05	0	0	0	0	0.05	25.0
Tennessee Portion	80.3	90.5	72.8	69.0	85.9	0.6	0.7	3.2	3.9
Monroe - El Dorado (019)[b]	24.5	18.3	4.5	2.206	9.0	1.8	7.3	0.5	2.0
Arkansas Portion	9.5	38.9	3.7	2.2	23.2	1.4	14.7	0.1	1.0
Louisiana Portion	15.0	5.44	0.8	0.006	0.04	0.4	2.7	0.4	2.7
Northeast Arkansas (020)	15.4	68.4	10.5	10.0	64.9	0.04	0.3	0.5	3.2

[a] 1972 emissions in data bank as of June 27, 1974

[b] Interstate

Table A-8. Arkansas Emission Summary, SO_2[a] (Contd)

AQCR	Total 10^3 tons/yr	% from Fuel Combustion	Annual Emissions from Fuel Combustion 10^3 tons/yr	Electrical Generation		Other Point Source Fuel Combustion		Area Source Fuel Combustion	
				10^3 tons/yr	% of total	10^3 tons/yr	% of total	10^3 tons/yr	% of total
Northwest Arkansas (021)	3.4	82.5	2.8	2.6	76.5	0.002	0.06	0.2	5.9
Shreveport-Texarkana-Tyler (022)[b]	65.8	7.6	5.0	1.036	1.6	1.9	2.9	2.07	3.1
Arkansas Portion	4.9	16.3	0.8	0.3	6.1	0.4	8.2	0.1	2.0
Louisiana Portion	6.4	18.9	1.2	0.006	0.09	0.3	4.7	0.9	14.1
Oklahoma Portion	0.2	35.0	0.07	0	0	0	0	0.07	35.0
Texas Portion	54.3	5.8	3.2	1.0	1.8	1.2	2.2	1.0	1.8
EMISSION TOTALS (ARK. TOTALS ONLY)	201.0 44.0		99.9 21.9	86.9 17.2		5.3 2.8			

Table A-9. Particulate Emissions Inventory Summary - Central Arkansas AQCR (016)[a]

(all in tons/year)

Source Category and Fuel Used	Pulaski and Saline Counties		All Counties Except Pulaski and Saline		AQCR Total	
	Existing	After Control Strategy	Existing	After Control Strategy	Existing	After Control Strategy
I. Fuel Combustion Stationary Sources						
A. Residential Fuel						
1. Natural gas - area sources	98	98	118	118	216	216
B. Commercial + Institutional (Fuel[b])						
1. Distillate oil - area sources	28	28	36[b]	36[b]	64	64
2. Residual oil - area sources	30	30	39[b]	39[b]	69	69
3. Natural gas[b]	67	67	82[b]	82[b]	149	149
C. Industrial Fuels						
1. Distillate oil - area sources	48	48	51	51	99	99
2. Residual oil - area sources	11	11	10	10	21	21
point sources	0	0	11	11	11	11
3. Natural gas area sources	301	301	314	314	615	615
point sources	240	240	116	116	356	356
natural gas engines	33	33	0	0	33	33
D. Steam-Electric Power Plant Fuel						
1. Distillate oil	25	25	0	0	25	25
2. Residual oil	6	6	9	9	15	15
3. Natural gas	72	72	80	80	152	152
E. Total Stationary Fuel Combustion	959	959	866	866	1825	1825

Table A-9. Particulate Emissions Inventory Summary - Central Arkansas AQCR (016)[a] (Cont'd)

(all in tons/year)

Source Category and Fuel Used	Pulaski and Saline Counties		All Counties Except Pulaski and Saline		AQCR Total	
	Existing	After Control Strategy	Existing	After Control Strategy	Existing	After Control Strategy
II. Process Losses	(All are point sources)					
1. Chemical Process Industries	891	378	153	10	1044	388
2. Food and Agricultural Industries	714	182	2693	737	3407	919
3. Metallurgical Industries	43099	1778	4138	548	47237	2326
4. Mineral Products Industries	11052	843	33452	850	44504	1693
5. Wood Processing	50	45	90	8	140	53
III. Solid Waste Disposal						
A. Incineration						
1. On-site point sources	349	349	1315	1315	1664	1664
B. Open Burning						
1. On-site area sources	1197	1197	1469	1469	2666	2666
point sources	16	16	555	555	571	571
2. Dumps point sources	120	120	1271	1271	1391	1391
C. Wood Boilers point sources	755	755	4338	4338	5093	5093

Table A-9. Particulate Emissions Inventory Summary - Central Arkansas AQCR (016)[a] (Cont'd)

(all in tons/year)

Source Category and Fuel Used	Pulaski and Saline Counties		All Counties Except Pulaski and Saline		AQCR Total	
	Existing	After Control Strategy	Existing	After Control Strategy	Existing	After Control Strategy
IV. Transportation						
A. Motor Vehicles						
1. Gasoline powered	511	511	936	936	1447	1447
2. Diesel powered	64	64	113	113	177	177
B. Aircraft	134	134	8	8	142	142
C. Railroads	27	27	102	102	129	129
D. Vessels	2	2	11	11	13	13
Grand Totals						
A. Area Sources	2518	2518	3289	3289	5807	5807
B. Point Sources	57422	4842	48221	9848	105643	14690
C. Total	59940	7360	51510	13137	111450	20497

[a] Obtained from the Arkansas SIP, Appendix I, Control Strategy Sections.

[b] Includes only contributions from Area Sources; Point Source contributions from these fuels are included in the Industrial Fuel Sector of the inventory.

Table A-10. Arkansas Fuel Combustion Emission Regulation

Sulfur Dioxide	No person shall cause or permit the emission from any premises of an air contaminant which contains sulfur oxides, sulfuric acid mists and/or sulfur trioxide, in such manner and amounts that the maximum concentrations attributable to such emission in the ambient air at any place beyond the premises on which the source is located, exceeds for any thirty (30) minute average the following limits: Sulfur dioxide - 0.20 parts per million Sulfuric acid mists or sulfur trioxide - 30.0 micrograms per cubic meter
Particulater Matter	No person shall cause or permit the emission of particulate matter from any premises on which equipment is located in excess of the following:[1] (1) Suspended particulate matter contributed from such premises above background shall not exceed an average of 75 $\mu g/m^3$ for any 24-hour period or 150 $\mu g/m^3$ for any thirty (30) minute average as computed from appropriate dispersion formulae or ambient air sampling as determined by the Director.* (2) Particulate fallout contributed from such premises above background shall not exceed 15 tons/mile^2/month (5.25 grams/meter^2/month). (3) The number of particles larger than 60 microns in diameter downwind of the premises shall not exceed 120 per square centimeter for 24 consecutive hours. No person shall cause or permit the emission of particulate matter from equipment installed, altered or replaced after the effective date of this code, as measured in the flue, in excess of the allowable emission rate as shown in Figure A-2.[2]

*Director refers to the director of the Department of Pollution Control and Ecology.

[1]Corresponds to Subsection 7(a) of the Arkansas Air Code.

[2]Corresponds to Subsection 7(b) of the Arkansas Air Code.

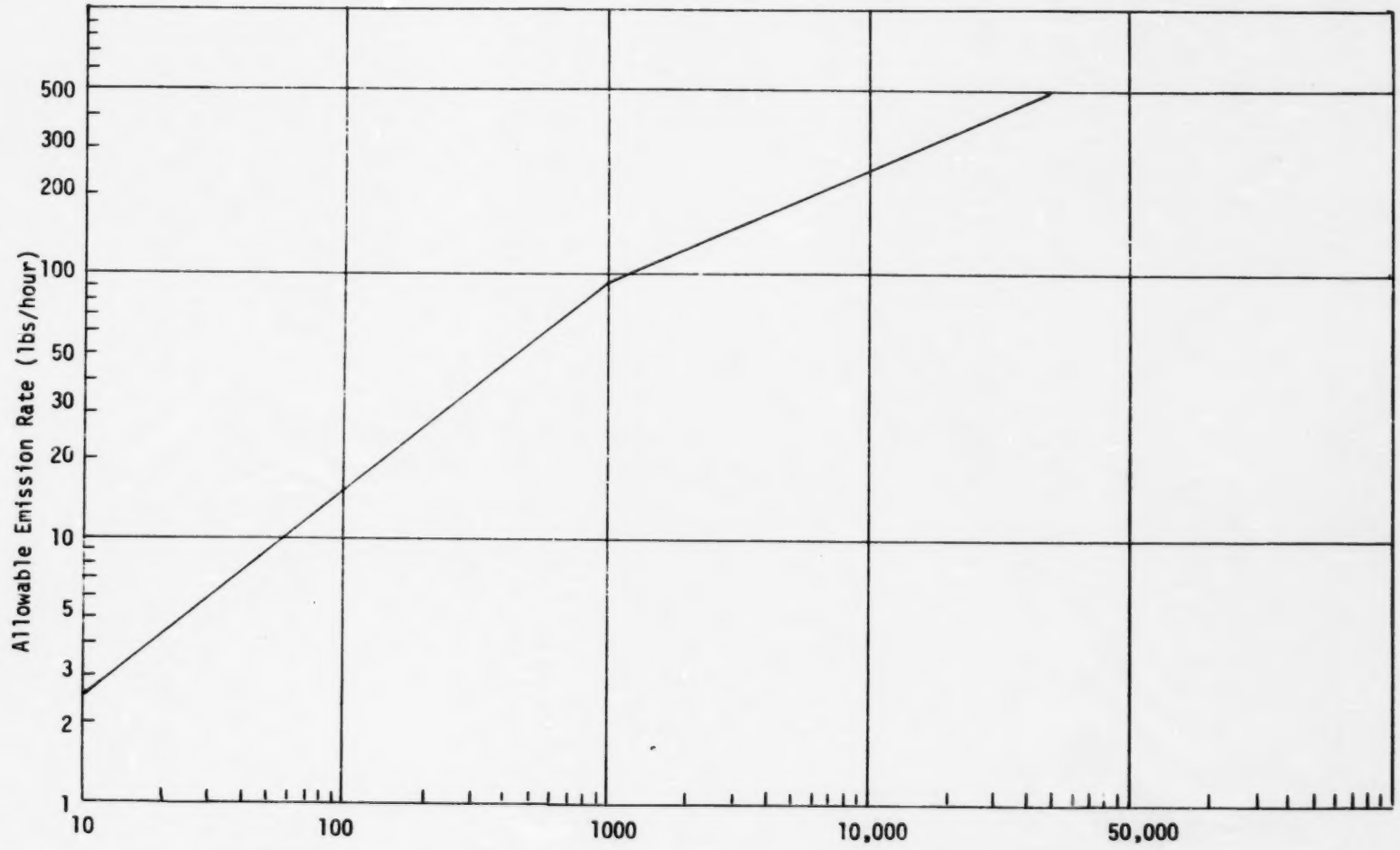

Figure A-2. Potential Emission Rate - Without Control Equipment (lbs/hour)

Table A-11. Comparison of 1971 and 1973 Fuel Use in Arkansas Power Plants [a]

	1000 BBL Oil		10^6 ft^3 Gas	
	1971	1973	1971	1973
Plant 1 Lynch	332.8	207.75	5078.44	5464.38
Plant 2 Lake Catherine	537.4	2391.12	31225.34	17442.03
Plant 3 Bailey	88.8	202.90	4775.31	959.57
Plant 4 Moses	507.90	753.70	1072.16	0.00
Plant 5 Ritchie	1078.00	2800.29	35045.91	14342.11
Plant 6 Fitzhugh	39.80	162.6	2318.79	726.00
Plant 7 Couch	75.60	177.63	7004.61	6252.39
Totals	2660	6696	86521	45186

[a] Based on Federal Power Commission fuel schedules as retrieved from EPA data files July, 1974.

Table A-12. Arkansas Required Emission Reductions, Particulates[a]

SIP					1972 DATA			
AQCR	AQ Measurement Control Value	Emissions (10^3 Tons)	Allowable Emissions (10^3 Tons)	1975 Estimated Emissions After Controls (10^3 Tons)	Percent Reduction Required Based On 1973 AQ Data	NEDS Emissions (10^3 Tons)	Allowable Emissions (10^3 Tons)	Emission Tolerance (10^3 Tons)
016	b	111450	-	20497[c]	37	77.9	49.1	-28.8
017	-	-	-	-	49	11.1	5.7	- 5.4
(Ark only)	-	-	-	-	49	7.4	3.8	- 3.6
018	-	-	-	-	58	18.4	7.7	-10.7
(Ark only)	-	-	-	-	56	0.8	0.4	- 0.4
019	-	-	-	-	25	29.8	22.4	- 7.4
(Ark only)	-	-	-	-	25	13.6	10.2	- 3.4
020	-	-	-	-	75	33.4	8.4	-25.0
021	-	-	-	-	-1	10.7	10.8	+ 0.1
022	-	-	-	-	47	162.7	85.9	-76.1
(Ark only)	-	-	-	-	47	8.1	4.3	- 3.8

[a]Based on a proportional change of emissions to air quality.

[b]Though the SIP provides computer predicted air quality values of
1) 120 ug/m^3 (AAM) = 100 ug/m^3 (AGM) for the Little Rock-North Little Rock area and
2) 260 ug/m^3 (AAM) for the Little Rock area (including Bauxite which is the site of extensive mineral processing),
it is not specifically stated what air quality value was used for the development of the control strategy. Thus the emission reductions were not based on an air quality control value, but rather on the reductions that would result from application of the Air Code on selected sources.

[c]Reductions based on selective application of provisions of the ARkansas Air Code.

Table A-13. Arkansas Required Emission Reductions, SO_2[a]

AQCR	SIP: AQ Measurement Control Value	SIP: Emissions (10^3 Tons)	SIP: Allowable Emissions (10^3 Tons)	SIP: 1975 Estimated Emissions After Controls (10^3 Tons)	1972 DATA: Percent Reduction Required Based On 1973 AQ Data	1972 DATA: NEDS Emissions (10^3 Tons)	1972 DATA: Allowable Emissions (10^3 Tons)	1972 DATA: Emission Tolerance (10^3 Tons)
016	23.0 $\mu g/m^3$ [b]	--	--	--	c	9.6	--	--
017	--	--	--	--	c	1.6	--	--
Ark (only)	--	--	--	--	c	1.1	--	--
018	--	--	--	--	c	80.7	--	--
Ark (only)	--	--	--	--	c	0.2	--	--
019	--	--	--	--	c	24.5	--	--
Ark (only)	--	--	--	--	c	9.5	--	--
020	--	--	--	--	c	15.4	--	--
021	--	--	--	--	c	3.4	--	--
022	--	--	--	--	c	65.8	--	--
Ark (only)	--	--	--	--	c	4.9	--	--

[a] Based on a proportional change of emissions to air quality.

[b] This is the SO_x measurement taken from Table A-6 and it represents the maximum 24-hour reading taken during 11 months in 1970. Since it is much lower than the standard, there was no need for the SIP to include a control strategy for this pollutant.

[c] Not calculated. See Table A-5 for explanation.

APPENDIX B

Tables B-1 and B-2 are the assessment of AQCRs which should be examined for the fuel switching impact on particulate and SO_2 emissions. They also provide an identification of those AQCRs which show little potential for fuel revision or regulation relaxation if ambient air standards are to be attained.

The general criteria for candidacy is covered by the list of questions found at the beginning of Section 2.0. Some of the more important criteria is reflected by the tables in this appendix. These criteria include (1) the breadth of air quality violations, (2) the fraction of total emissions resulting from fuel combustion, (3) proposed AQMA designations, (4) expected attainment dates, (5) total regional emissions, and (6) regional tolerances for emissions increase.

It should be noted that an AQCR may not necessarily need relaxation of regulations in order to accomplish fuel switching. Further, a good candidate in Tables B-1 and B-2 may later show little potential for fuel switching after individual sources are examined. Finally, it is possible that an AQCR may have air quality levels below standard at present and may require more <u>strict</u> regulations than currently exist if all fuel burning sources were converted to dirtier fuels, i.e., "average" emission rate now may be below "average" regulations.

Table B-1. Candidacy Assessment for Relaxation of Particulate Regulations - Arkansas

AQCR	# of Stations	# of Stations Rpt'g Violations of Nat'l Secondary Standard: Annual	24-hour	Expected Attainment Dates (Secondary[a] Standards)	Counties with Proposed AQMA Designations for Particulates	1972 Total Emissions (10^3 tons/yr)	1972 Emissions from Fuel Combustion (10^3 tons/yr)	% Emissions from Fuel Combustion	Tolerance for Emissions Increase (10^3 tons/yr)	Regionwide[d] Evaluation
Central Arkansas (016)	10	5	2	7/75	Pulaski and Saline	77.9	8.5	10.9	-28.8	Poor
Metropolitan Ft.Smith (017)	8	3	2	7/75	None	11.1	1.034	9.3	- 5.4	Poor
(Arkansas Portion)	3	3	2			7.4	.53	7.2	- 3.6	Poor
Metropolitan Memphis (018)	20	3	8	7/75		18.5	4.3	23.2	-10.7	Poor
(Arkansas Portion)	6	2	3		None	0.8	0.1	12.5	- 0.4	Poor
Monroe-El Dorado (019)	8	1	4	7/75		29.8	13.7	45.9	- 7.4	Poor
(Arkansas Portion)	5	0	1		None	13.6	8.1	59.5	- 3.4	Poor
Northeast Arkansas (020)	24	5	15	b	None	33.4	2.7	8.0	-25.0	Poor
Northwest Arkansas (021)	2	0	0	b	None	10.7	1.4	13.4	+ 0.1	Good
Shreveport-Texarkana-Tyler (022)	11	3	4	7/75		162.7	9.3	5.7	-76.1	Poor
(Arkansas Portion)	4	2	1	7/75	None	8.1	2.3	27.9	- 3.8	Poor

[a] based on information obtained from EPA-Durham. Dates apply to all portions of interstate AQCR.

[b] Ambient air quality levels were below standards at the time the dates were formalized.

[c] SMSA stands for the Standard Metropolitan Statistical Area designation used by the U. S. Census.

[d] Responses in this column refer to an AQCR's candidacy for increasing particulate emissions.

Table B-2. Candidacy Assessment for Revision of SO_2 Regulations - Arkansas

AQCR	# of Stations	# of Stations Reporting Violations of National Standards Annual	24-hr	3-hr	Expected Attainment Date (Secondary Standards)[a]	Counties with Proposed AQMA Designations for SO_2	1972 Total Emissions (10^3 tons/yr)	1972 Emissions from Fuel Combustion (10^3 tons/yr)	% Emissions from Fuel Combustion	Tolerance for Emissions Increase (10^3 tons/yr)	Regionwide Evaluation
Central Arkansas (016)	2	0	0	0	b	None	9.6	3.8	39.5	d	e
Metro-Fort Smith (017)[c]	3	0	0	0	b		1.6	0.403	25.2	d	e
Arkansas Portion	1	0	0	0		None	1.1	0.303	27.6	d e	e
Metro-Memphis (018)[c]	11	0	0	0	b		80.7	72.9	90.3	d	e
Arkansas Portion	3	0	0	0		None	0.2	0.04	20.0	d	e
Monroe-El Dorado (019)[c]	3	0	0	0	b		24.5	4.5	18.3	d	e
Arkansas Portion	2	0	0			None	9.5	3.7	38.9	d	e
Northeast Arkansas (020)	1	0	0	0	b	None	15.4	10.5	68.4	d	e
Northwest Arkansas (021)	1	0	0	0	b	None	3.4	2.8	82.5	d	e
Shreveport-Texarkana-Tyler (022)[c]	7	0	0	0	b		65.6	5.0	7.6	d	e
Arkansas Portion	1	0	0	0		None	4.9	0.8	16.3	d	e

[a] Based on information obtained from EPA-Durham. Dates apply to all portions of the interstate AQCR's.

[b] Ambient air quality below NAAQS where SIP was submitted.

[c] Interstate.

[d] Not calculated; see Table A-5 for explanation.

[e] Regulation revision is not indicated by the available data, however, it does seem that these AQCRs are "Good" candidates for increasing SO_2 emissions.

Table B-3. Statewide Fuel Use at Fuel Combustion Point Sources - Arkansas[a]

Fuel	Power Plants (heat input-10^6 Btu/hr)	Industrial-Commercial Sources (heat input-10^6 Btu/hr)	Total
Natural Gas	5610.	6567	12177
Oil	5328	901	6229
Wood (includes some	-	2388*	2388*
	10938 total heat input to power plants	9856 total heat input to industries	20794

[a]A summary of fuel combustion data obtained from NEDS information sheets on individual sources.

*Based on a rough estimate of 5000 Btu/lb for the materials in this category, and a total of 2,091,840 tons of this material being consumed in 1972.

APPENDIX C

This appendix provides a characterization of individual power plants by AQCR. Current power plant information used to prepare Table C-1 was obtained from three main sources: (1) Federal Power Commission computerized listings of power plants and their associated fuel use, (2) the National Coal Association's Steam-Power Plant Factors, listing of power plants and fuel use in 1972, and (3) emission data in the NEDS data bank as of June 29, 1974. Fuel schedules for 1973 were extracted from the FPC data (1 above), and this was used in conjunction with NEDS emission data to estimate 1973 emissions for each of the sources. When 1973 fuel schedules were not available, 1972 schedules were used as taken from NEDS. SO_2 and particulates emissions are those associated with the fuel shown. When actual emissions were not listed in NEDS, AP-42 emission factors were used to estimate SO_2 and particulate emissions, based on fuel schedules. Those plants which have emissions data modified by FPC information are marked with an asterisk(*).

After the name of each plant is a listing of the fuels for which the plant was designed (from source 2). For the purposes here, it is assumed that when a plant is shown to have dual fuel capability, it is able to use entirely one fuel or the other.

Also shown is the 1975 regulations which are currently applicable to the given plant, taken from Table A-9.. (Particulate limits are assumed to be based on the entire heat input of the plant.)

It might be cautioned that AQCR total emissions calculated in the tables of Appendix C (and also Appendix D) may not agree exactly with total emissions represented in Appendix A (Tables A-7, A-8). This is a result of both differing fuel schedules in 1973 compared to previous years and the relative "completeness" of the NEDS data bank.

The units for the annual amounts of fuel used for individual sources in this Appendix are 10^3 gallons for oil, and 10^6 cubic feet for natural gas.

Table C-1. Power Plant Fuel Combustion Point Source Characterization - AQCR 16

County	Company, (Plant Name) Size and Fuel Design	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
*Hot Spring	Arkansas P&L (Lake Catherine) 757 MWE Oil	Oil 1.0% S	100422	1717	7884	1.05			400	0.05		
	Gas	Gas	17442	2025	4	<.01			131	0.01		
*Pulaski	Arkansas P&L (Cecil Lynch) 260 MWe Oil	Oil 0.3% S	8727	149	35	0.05			205	0.31		
	Gas	Gas	5464	638	1	<.01			41	0.01		

*Modified by FPC fuel schedules.

Table C-1. Power Plant Fuel Combustion Point Source Characterization - AQCR 19

County	Company, (Plant Name) Size and Fuel Design	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Ouachita	Ark. Elec Coop. (McClellan) 136 MWe Gas	Oil 1.0% S	30500	484	7200	1.04			122	0.06		
		Gas	2820	322	1	-			21	0.01		

Table C-1. Power Plant Fuel Combustion Point Source Characterization - AQCR 20

County	Company, (Plant Name) Size and Fuel Deisgn	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Craighead	(Jonesboro) W&L 28 MWE Gas	Gas	450	51.4	<1	-			4	0.02		
*Phillips	Arkansas P&L (Robert Ritchie) 870 MWe Oil Gas	Oil 1.0% S	117600	2040	9262	1.04			471	0.05		
		Gas	14342	1675	4	.01			108	0.01		
*St. Francis	Arkansas P&L (Hamilton Moses) 132 MWe Oil Gas	Oil 1.0% S	31668	543	126	0.05			2490	1.05		
*Woodruff	Ark. Elec. Coop. (Bailey) 120 MWe Gas	Oil 2.3% S	8526	145	1540	2.41			34	0.05		
		Gas	960	110	<1	-			7	0.02		

*Modified by FPC fuel schedules.

Table C-1. Power Plant Fuel Combustion Point Source Characterization - AQCR 21

County	Company, (Plant Name) Size and Fuel Design	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
*Franklin	Ark.Elec.Coop. (Fitzhugh) 60 MWe	Oil 2.3% S	6846	122	1234	2.31			27	0.05		
	Gas	Gas	726	83	< 1	-			6	0.02		

*Modified by FPC fuel schedules.

Table C-1. Power Plant Fuel Combustion Point Source Characterization - AQCR 22

County	Company, (Plant Name) Size and Fuel Design	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
*Lafayette	Arkansas P&L (Harvey Couch) 150 MWe Oil	Oil 1.0% S	7476	128	586	1.05			28	0.05		
	Gas	Gas	6252	706	2	<.01			46	0.02		

*Modified by FPC fuel schedules.

APPENDIX D

The Table D-1 in this appendix lists individual industrial/commercial/institutional sources of particulates and SO_2 emissions which might show fuel switching potential. The sources are from a NEDS rank order emissions listing.

It should be cautioned that the percent emissions accounted for is different than the "% of fuel use accounted for," It is possible that several potential fuel switch sources could be overlooked by the cutoff point on the emissions (i.e., a reasonable sized natural gas used may emit below our cutoff point in the NEDS rank order list).

No information was available for feasibility of <u>any</u> fuel switching.

The units for the annual amounts of fuel used are as follows:

10^3 gallons for oil
10^6 cubic feet for natural gas
tons for wood and bagasse.

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 16

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Chicot	J. H. Hamlem	Wood	3130		2				43			
Clark	Gordon Lumber	Wood	6750		6				93			
Clark	Milus Bean Lumber	Wood	4400		3				61			
Conway	Ark. Kraft Corp.	Wood	46900		35				52			
		Gas	10500	1199	3	0.0006			95	0.02		
Dallas	Georgia Pacific	Wood	43700		33				601			
		Gas	527	60.2	<1	-			3	0.01		
Dallas	Sparkman Lumber	Wood	13000		8				180			
Drew	Herman Wilson Lumber	Wood	49400		38				680			
Drew	Selma Timber	Wood	9000		7				124			

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 16

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Garland	Bates Lumber	Wood	5200		4				72			
	General Cable	Gas	1200	137	< 1				12	0.02		
	Weyerhaeuser	Wood	101000		75				1380			
	B.G.Wilson Lumber	Wood	4680		4				64			
Grant	W.S. Fox & Sons	Wood	38300		29				131			
	J.L. Williams	Wood	2300		2				15			
	Herman Wilson	Wood	89500		68				1232			
Hot Springs	Hot Spr.Cty.Lbr	Wood	20800		16				288			
	Intn. Paper	Wood	21300		16				292			
Jefferson	Intn. Paper	Oil 3.5% S	1700		468				<1			
		Gas	3540		< 1				<1			
		Wood	184000		138				127			

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 16

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Jefferson	Weyerhaeuser	Gas	1130	137	<1	-			10	0.02		
	W. S. Fox & Sons	Wood	26000		20				358			
Pulaski	Bruce Furniture	Wood	7140		5				98			
	J. H. Hamlen & Son	Wood	8760		6				120			
	W. R. Wrape Stave	Wood	20000		15				275			
Saline	Alcoa	Gas	5600	639	<1	-			52	0.02		
	Holicer-Jones Lbr	Wood	6920		5				95			
	Reynolds Metal	Gas	11080	1265	<1	-			86	0.02		

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 17

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Sebastian	Ward Furn.Mfg	Wood	4630		3				27			

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 19

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Ashley	Georgia Pacific	Oil 1.0% S*	51600	825	3664	1.01			174	0.05		
		Gas	4526	517	< 1	-			16	0.01		
		Wood	358000		269				5520			
Bradley	Potlatch Forests	Wood	133000		101				159			
Nevada	Potlatch Forests	Wood	36400		27				50			
Ouachita	Bearden Lumber	Wood	91200		68				1254			
	Intn. Paper	Oil 3.94% S	1084	18.6	380	4.66			12	0.15		
		Gas	2520	301	< 1	-			22	0.02		
		Wood	83800	95.7	63	0.15			115	0.27		
	Rogers Lumber	Wood	3820		3				53			
Union	E. L. Bruce	Wood	6250		5				86			

*Assumed % Sulfur in Oil
Oil - 10^3 Gal: Gas - 10^6 CF: Wood/Coal - Tons

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 19

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Union	Cross Oil & Ref.	Gas	876	100	<1	-			8	0.02		
	Georgia Pacific	Wood	6500		5				89			
	Lion Oil Co.	Oil 3.4% S	1767	24.8	393	3.62			12	0.11		
		Gas	3480	406	<1	-			33	0.02		
	Monsanto	Oil 3.4% S	125	1.97	33	3.82			1	0.12		
		Gas	650	74.2	< 1	-			6	0.02		
	Olinkraft Inc.	Wood	100000		75				110			

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 20

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Mississippi	Agrico Chem	Gas	3400		< 1				30			
	Delta Prod.	Oil 2.0% S	65	1.1	10	2.08			<1	-		
		Gas	101	11.5	< 1	-			<1	-		
Monroe	Farrell-Cooper	Wood	11800		9				163			
Phillips	Arkla Chem Corp	Gas	3300	377	< 1	-			30	0.02		
Poinsett	The Singer Co.	Wood	5000		4				69			
White	Searcy Flooring	Wood	17500		13				241			

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 21

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Boone	Sutton Products	Wood	750		< 1				10			
Izard	Silica Prod.	Bagasse	2500 (tons)		0				28			
Pike	Monfreesbobo Lumber	Wood	1510		1				21			

Table D-1. Industrial-Commercial Fuel Combustion Point Source Characterization - AQCR 22

County	Plant Name	Fuel Use			Emissions							
					SO_2				Particulates			
					Existing		Allowable		Existing		Allowable	
		Type % Sulfur % Ash	Annual Quantity	Heat Input (10^6 Btu/hr)	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu	tons/yr	lbs/10^6 Btu
Columbia	Arkla Lumber	Wood	138000		104				128			
	Bromet Corp.	Gas	1800		<1				16			
Howard	Weyerhaeuser	Wood	86400		65				1190			
Little River	Ark. Cement	Gas	803	91.7	<1	-			7	0.02		
	Nekoosa Edwards Paper	Gas	2340	254	<1	-			3	0.003		
		Wood	241000		181				536			

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